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TRANSACTIONS

Über das Pentosan des Zuckerrohrs.

Von T. Tatsuno, F. Nishio, S. Aoki
und K. Yamafuji.

(Aus dem Institut für Zuckerforschung in Tainan)

Eingegangen am 24. 4. 1941.

Der Zuckerrohrstengel enthält eine ziemlich grosse Menge von Pentosan. In der vorliegenden Abhandlung werden die Ergebnisse der Versuche über den Pentosangehalt der Bagasse, die Isolierung des Furfurols und die Herstellung des Furfurolharzes mitgeteilt.

1. Pentosangehalt der Bagasse.

Die in der Fabrik ausgepreßte Bagasse wurde mit Hilfe einer Reihe von Sieben mit verschiedenen Löchergrößen gesiebt. Die chemische Zusammensetzung der einzelnen Teile ist folgende (Tabelle I).

Tabelle I.

Löchergrösse des Siebes in mm	>2	2—0,75	0,75—0,3	0,3—0,15	<0,15
	In % der Trockensubstanz				
Asche	1,31	3,11	4,97	5,56	12,38
Kaltes Wasser-Extrakt	0,06	0,13	0,37	0,50	1,52
Heisses Wasser-Extrakt	1,36	1,82	2,68	4,48	4,80
Verd. Alkali-Extrakt	29,52	31,67	35,24	37,89	40,19
Alkohol-Benzol-Extrakt	1,74	2,36	2,57	2,89	3,27
Lignin	21,14	21,11	21,61	22,06	22,10
Pentosan	30,62	29,35	28,26	27,12	26,38
Cellulose	58,50	53,11	48,82	46,59	42,94
α-Cellulose	41,25	37,17	33,85	31,94	29,10

2. Isolierung des Furfurols.

10 g Bagasse wurden mit Schwefelsäure oder Phosphorsäure unter Zusatz von

Katalysatoren in einem Hochdruckkessel auf 3 Atm. erhitzt und das entstandene Furfurol wurde nach 1, 3 oder 5 Stunden bestimmt (Tabellen II bis V).

Tabelle II.

Hydrolysiert mit Schwefelsäure. Erhitzungsdauer: 1 Stunde.

Katalysator	Säurekonzentration in %	Ausbeute in g	Verhältnis der Ausbeute	Pentosan im Rückstand in %
1,5 g $AlCl_3$	5,0	0,101	112	0,36
1,5 g NaCl	"	0,108	119	0,43
1,5 g Na_2HPO_4	"	0,100	111	0,66
——	"	0,090	100	0,73
1,0 g $AlCl_3$	2,5	0,083	122	1,33
1,0 g NaCl	"	0,076	113	1,06
1,0 g Na_3HPO_4	"	0,063	93	1,55
——	"	0,068	100	1,31
1,0 g $AlCl_3$	1,0	0,083	193	1,60
1,0 g NaCl	"	0,043	99	1,60
1,0 g Na_2HPO_4	"	0,039	90	2,68
——	"	0,043	100	1,73
1,0 g $AlCl_3$	0,5	0,090	264	4,45
1,0 g NaCl	"	0,066	194	6,33
1,0 g Na_2HPO_4	"	0,024	70	6,40
——	"	0,034	100	4,58

Tabelle III.

Hydrolysiert mit Schwefelsäure. Erhitzungsdauer: 3 Stunden.

Katalysator	Säurekonzentration in %	Ausbeute in g	Verhältnis der Ausbeute	Pentosan im Rückstand in %
1,5 g $AlCl_3$	2,5	0,085	116	0,51
1,5 g NaCl	"	0,082	112	0,53
1,5 g Na_2HPO_4	"	0,065	89	0,92
——	"	0,073	100	0,61
1,5 g $AlCl_3$	1,0	0,096	172	0,68
1,5 g NaCl	"	0,067	117	1,00
1,5 g Na_2HPO_4	"	0,051	89	1,27
——	"	0,057	100	1,05
1,0 g $AlCl_3$	0,5	0,102	208	1,02
1,0 g NaCl	"	0,053	108	1,88
1,0 g Na_2HPO_3	"	0,025	51	6,61
——	"	0,049	100	2,42

Tabelle IV.

Hydrolysiert mit Phosphorsäure. Erhitzungsdauer: 3 Stunden.

Katalysator	Säurekonzentration in %	Ausbeute in g	Verhältnis der Ausbeute	Pentosan im Rückstand in g
1,5 g $AlCl_3$	2,5	0,086	158	0,65
1,5 g NaCl	"	0,060	116	2,06
——	"	0,055	100	2,42
1,5 g $AlCl_3$	1,0	0,079	203	0,90
1,5 g NaCl	"	0,053	138	3,09
——	"	0,039	100	4,41
1,0 g $AlCl_3$	0,5	0,063	171	2,66
1,0 g NaCl	"	0,032	89	6,38
——	"	0,037	100	6,88

Tabelle V.

Hydrolysiert mit Phosphorsäure. Erhitzungsdauer: 5 Stunden.

Katalysator	Säurekonzentration in %	Ausbeute in g	Verhältnis der Ausbeute	Pentosan im Rückstand in g
1,5 g $AlCl_3$	2,5	0,070	125	1,24
1,5 g NaCl	"	0,047	85	1,79
——	"	0,056	100	1,98
1,5 g $AlCl_3$	1,0	0,067	158	1,23
1,5 g NaCl	"	0,041	97	3,06
——	"	0,042	100	3,72
1,5 g $AlCl_3$	0,5	0,066	200	1,77
1,5 g NaCl	"	0,032	98	4,23
——	"	0,033	100	6,17

Die Bagasse wird durch Schwefelsäure viel besser hydrolysiert, als durch Phosphorsäure. Unter den drei Katalysatoren übt das Aluminiumchlorid auf die Zersetzung des Pentosans die stärkste beschleunigende Wirkung aus.

3. HERSTELLUNG DES FURFUROLHARZES.

Die Bagasse wurde mit verschiedenen Mengen von Salzsäure und Phenol versetzt. Nach dem Erhitzen wurde dann die Mischung gepreßt. Einige Beispiele sind in Tabelle VI enthalten.

Tabelle VI.

Versuch	Bagasse in g	Salzsäure in cc	Phenol in g	Ausbeute in g	Temperatur bei der Pressung in °C	Zugfestigkeit des Harzes in kg/cm²
26	100	30	30	69,3	155	79
75	100	3	15	70,0	135	145

80	100	12	15	74,5	140	92
89	100	3	25	71,0	155	185
93	100	1	15	78,0	170	155
95	100	2	15	69,5	163	252
104	100	2	15	80,5	136	216
109	100	2	15	81,0	153	167

Im allgemeinen ist die Zugfestigkeit der aus Bagasse hergestellten Furfurolharze etwas kleiner als diejenige der Bakeliten. Die Produktionskosten der Furfurolharze sind verhältnismässig gering, wenn sie in der obenerwähnten Weise direkt aus der Bagasse hergestellt werden.

ABSTRACTS
from
TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noted.)

Enzymatic Studies on Cereals. (Part XIII).

On the Change of the Amylase Action During the Ripening of Rice.

(pp. 677∼680)

By Gohei Yamagisi.

(Morioka Imperial College of Agriculture and Forestry;
Received August 11, 1941.)

In the previous papers of this series the author has declared that in the ungerminated rice-seeds there was in existence the water-insoluble zymogen amylase, which, at the germination, was decreased whereas the water-soluble amylase was increased.

Based on this fact, we are lead to suppose that during the ripening of rice the phenomena reverse to that of the germination may occur.

It is the purpose of this investigation to confirm whether this deduction is right or not, and the following results were obtained:

In the early stage of ripening the water-soluble amylase was most abundant, but afterwards that activity appeared to decrease gradually. The salt-soluble form of amylase, on the contrary, was increased as maturity advanced.

Of all amylases, this was so in the case of the saccharifying enzyme.

Thus, the author wants to claim that in the course of the ripening of the rice-seeds some parts, at least, of the amylase are converted into an inactive zymogen form.

On Xylitol. (3).

Physical Properties of Xylitol.

(pp. 681∼684)

By T. Yabuta, K. Aso, S. Kimoto, and K. Miwa.

(Agricultural Chemical Labolratoly, Tokyo Imperial University;
Received July 8, 1941,)

Studies on "Tosetu," a Soy-bean Preparation. I.

On the Changes of Composition of Tosetu during its Manufacture and Storage.

(pp. 685～690)

By K. KATAI and B. KITAHARA.

(Department of Agriculture, Kyūshū Imp. University and Nippon Yusi Kabusiki Kaisya;
Received August 11, 1941.)

Ascorbic Acid Content of Dried Peel, Canned Fruit and Juice of Satsuma Orange (Mandarin orange).

(pp. 691～696)

By Yasuo IWASAKI and Toshio KOMATSU.

(Institute of Rural Industry, Department of Agriculture and Forestry;
Received August 6, 1941.)

Studies on Red Yeast. 1. *Sporobolomyces* nov. sp.

(Report 3) Carotenoid Pigments in the Red Yeast *Sporobolomyces* nov. sp.

(pp. 697～705)

By Izue YAMASAKI, Seizi MORISITA, and
Motomasa KAKEI.

(Agricultural Chemical Institute, Kyūshū Imperial University, Hukuoka;
Received August 11, 1941.)

The red color of the yeast *Sporobolomyces* is due to at least 7 pigments, separable by partition between different solvents and by chromatographic adsorption method.

Six of the pigments are neutral, one acidic.

In quantitative determination of three most abundant pigments, the yeast contains 23 γ β-carotin, 92 γ torulin, 41.7 mg of acidic pigment in 1 g dried yeast.

Of these, 12 γ β-carotin was utilized as provitamin A by rats, 50 γ torulin and 100 γ of acidic pigment were useless.

Therefore it is confirmed that the yeast *Spolobolomyces*, contrary to the reports of previous authors, contains pro-vitamin A as does the red torula yeast.

Thanks are due to the Department of Education for a Scientific Research Encouragement Grant.

On the Synthesis of Aspartic Acid.

(pp. 606～710)

By Yoshio TSUCHIYA.

(S. Suzuki and Co., Ltd.; Received May 17, 1941.)

The present author has prepared aspartic acid from fumaric acid (1 mol.), ammonia (2 mol.) and ammonium chloride (4 mol.), by heating this mixture in autoclave (180°, 10 Atm.) for 1 hour.

The yield of this amino acid was 60～65%. A further 10% of aspartic acid was obtained from residual solution, which was obtained after the aspartic acid had been separated from the above reaction mixture by a similar treatment to that above mentioned.

Functional Studies on Soil. (XXXII～XXXVII).

(pp. 711～720)

By Hideo MISU.

(Agricultural Experiment Station, Government General of Tyosen; Received May 13, 1941.)

Biochemical Studies of "Bakanae" Fungus.

Part 10. The Chemical Constitution of Gibberellin. I.

(pp. 721～730)

By T. YABUTA, Y. SUMIKI, K. ASO, T. TAMURA, H. IGARASI, and K. TAMARI.

(Tokyo Imperial University; Received August 1, 1941.)

Zur Chemie des Muskeleiweisses.

II. Mitteilung. Aminosäuregehalt des Kaninchenmuskeleiweisses.

(SS. 731～744)

Von M. KANDATU.

(Aus d. Agrikulturchem. Inst. d. Univers. Tokio, Japan: Eingegangen am 23. 6. 1941.)

Das Muskeleiweiss der hinteren Extremitäten von etwa zweikilogrammigen Kaninchen wurde dreimal mit Methanol digeriert, dann mit Äther extrahiert.

Von diesem gereinigten Muskeleiweiss wurde der Aminosäuregehalt nach der Brazier-Methode ermittelt.

Die Resultate sind folgende.

Aminosäure	% der trockenen Masse	Aminosäure	% der trockenen Masse
Glykokoll	4,2	Oxyglutaminsäure	1,5
Alanin	2,8	Tyrosin	*4,3 2,1
Valin	4,9		
Leucin	12,0	Oxyprolin	0,2
Prolin	7,7	Arginin	6,9
Phenylalanin	1,8	Histidin	1,1
Asparaginsäure	1,9	Lysin	9,6
Glutaminsäure	16,4	Tryptophan	*1,8

* kalorimetrisch

Untersuchungen über das sogenannte „Gluconobacter.“ I. Mitteilung.

(SS. 745~762)

Von Teijirô UYEMURA und Keiji KONDÔ.

(Wissenschaftl. Laboratorium von Ch. Takeda & Co. Ltd., Osaka;
Eingegangen am 28. 4. 1941.)

Biochemische Untersuchungen über die Bildung von Pflanzenbestandteilen.

(SS. 763~770)

Von Yukihiko NAKAMURA und Tokuji SCHIMOMURA.

(Institut für Landwirtschaftliche Chemie, Landwirtschaftliche Fakultät der
Kaiserlichen Hokkaido Universität: Eingegangen am 8. August 1941.)

Was für Bestandteile werden auf der ersten Stufe des Pflanzenwachstums erzeugt? Welche Beziehungen sind zwischen diesen Bestandteilen verschiedener Arten und dem weiteren Wachsen der Pflanzen vorhanden? Sind die auf diese Weise erzeugten Materialien der Zusammensetzung genau mit den bei der Vollendung des Wachstums gefundenen identisch oder nicht? Des weiteren wie steht es mit der Cellulose? Um diese Fragen zu beantworten, haben die Verfasser die jetzigen Untersuchungen angestellt. Als Versuchsmaterial haben sie sehr junge Stengel von Rapsen (japanisch „Natane-Mojaschi“) gebraucht.

I. Mitteilung. Einer der Verfasser (Nakamura) hat folgende Ergebnisse beobachtet: Auch bei den auf der allerersten Stufe des Wachstums stehenden

Pflanzen wie „Natane-Mojaschi" konnten mit Sicherheit α-Cellulose bestimmt werden und überdies neben dem großen Gehalt anorganischer Bestandteile auch stickstoffhaltige- und nichtstickstoffhaltige Verbindungen verschiedener Art, deren Polymerisationsgrade vielleicht kleiner zu sein scheinen, in großer Menge, und ferner konnten auch ätherlösliche Substanzen in kleineren Mengen mit jenen zusammen vorkommen, aber des kleineren Gehaltes der letzteren wegen konnte die von Hess, Sisson und anderen vorgelegte Arbeitshypothese wohl nicht angenommen werden.

Die chemischen und physikalischen Eigenschaften der isolierten α-Cellulose und auch die der sonstigen Verbindungen sind noch nicht klar, werden aber gegenwärtig von den Verfassern erforscht.

II. Mitteilung. Die Verfasser haben qualitative Versuche von einigen hauptsächlichen Enzymen, die zweifellos bei der Bildung der Pflanzenmaterialien, d. h. dem Wachstum die wichtigste Rolle spielen müssen, gemacht.

Invertase, Amylase als Carbohydrase, pepsinartige-, trypsinartige Enzyme und Erepsin als eiweißspaltende Enzyme, Glycerophosphatase und wahrscheinlich auch Lipase als Esterase wurden in dieser Prüfung nachgewiesen, und außerdem wurde zugleich einige Aufmerksamkeit dem Gebrauch des Stalagmometers bei Untersuchung der Lipasewirkung zugewendet.

Separation and Identification of Fatty Acids. Part 6.

Preparation of Pure Linoleic and Linolenic Acids by Means of Hydroxamic Acids Method.

(pp. 771~775)

By Y. INOUYE and H. YUKAWA.

(Biochemical Laboratory, Department of Agriculture, Kyoto Imperial University;
Received August 22, 1941.)

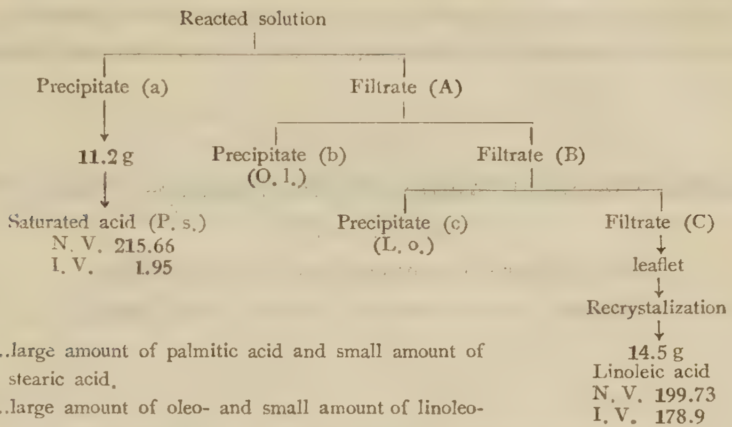
The bromination-debromination procedure has been universally used for the isolation of linoleic and linolenic acids because it is the only method which yields products which are pure as evaluated by iodine number. This procedure involves bromination of natural fatty acid mixtures, purification of the solid tetra- or hexabrmides, and removal of bromine with zinc. Rollett originally carried out the debromination reaction with zinc in boiling strongly acidified alcohol. Recently Brown and his coworkers have shown that linoleic and linolenic acids, prepared by the debromination procedure, contain about 12 and 15%, respectively, of isomeric acids which give nearly theoretical iodine numbers for C_{18}, although their repeated low temperature crystallization procedures for the isolation of these acids are, as they recognize, in a considerably less pure state than that which results from the debromination method.

The authors have studied the separation and identification of fatty acids as their hydroxamic acid derivatives which can be crystallized out and give acute melting points and from which free acids can be easily recovered by treating with mineral acid. This procedure should be remarked on the fact that, for the purpose of the separation of free pure acids, the chemical properties of double bond are not utilized at all, being different from the bromination-debromination procedure by which geometrical isomerizations have been discussed. The authors' process never comes in contact with double bonds in fatty acid molecule in the course of the preparation procedure, and consequently geometrical isomerizations at double bonds might be out of consideration.

The authors previously isolated crystalline linoleo- and linoleno-hydroxamic acids, the melting points being 41～42°C and 37～38°C respectively, from Rollett's linoleic and linolenic acids (This Journal, **16**, 510, 1940.). In the present work the authors studied the isolation of linoleic acid directly from cotton seed and soya bean oils and linolenic acid from linseed oil. As results, it was concluded that this method may be recommendable as one of preparation methods of the above pure acids, in better yield than that of the bromination method. And besides this, the authors believe these investigations would be of some significance to a further identification of naturally occurred or prepared geometrical isomeric acids of the above acids, though the present studies were limited in the sense of ordinary linoleic and linolenic acids.

44 g of cotton seed oil (saponification value, 190.66, mean mol. wt. 882.78, iodine value, 104.85) were treated two days at room temperature with 12.5 g of hydroxylamine hydrochloride and sodium ethylate (7.6 g as sodium), using alcohol as solvent, and then neutralized to congo red with alcoholic hydrochloric acid at 0°C. The process was tabulated as follows: The crystalline precipitates (a) were filtered off by suction and washed with ether and subsequently with water. 11.2 g (25% of the oil) were obtained as precipitates which were hydroxamic acid mixtures of saturated fatty acids. The filtrate (A) was evaporated to syrup in vacuum, after being neutralized with sodium acetate and carbonate, and then again slightly acidified with alcoholic-glacial acetic acid and diluted with cold water to about 1 litre, following extraction with ether. The ether solution (250 cc) was mixed with 100 cc of petroleum ether and cooled down to −5°C. The precipitate (b) obtained mainly consisted of oleohydroxamic acid, with a small amount of linoleohydroxamic acid (O. l.) and the filtrate (B), after being evaporated to 250 cc in vacuum, was mixed with 100 cc of petroleum ether and cooled to −5°C. Thus the precipitate (c) and the filtrate (C) were obtained. The (c) was almost leaflet crystal which was confirmed to be mainly linoleohydroxamic acid, accompanied with a little amount of oleohydroxamic acid (L. o.). The (C) was condensed to dryness under reduced pressure and recrystallized twice from petroleum ether, and 14.5 g of crystals (33% of the oil) were collected, the melting point being 41～42°C which was identified as the same as the linoleohydroxamic acid, previously prepared from the pure linoleic acid by the authors. And the free linoleic acid was quantitatively recovered by alcoholic sulphuric acid by the authors' usual

method. The neutralization value, 199.73 and the iodine value, 178.9 of the free acid were determined.



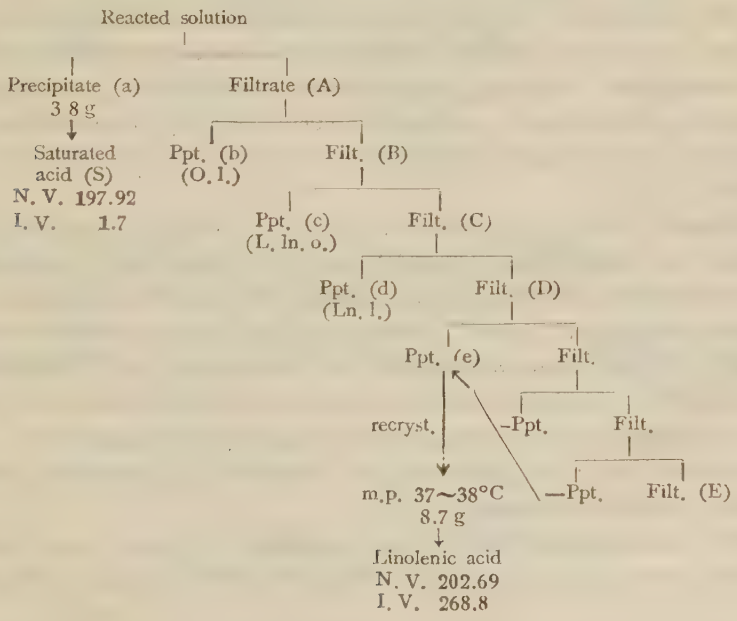
P. s. ......large amount of palmitic acid and small amount of stearic acid.

O. l. ......large amount of oleo- and small amount of linoleo-hydroxamic acid.

L. o. ......large amount of linoleo- and small amount of oleo-hydroxamic acid.

Almost the same result was obtained from soya bean oil (saponification value, 191.6, iodine value, 140.99). The yield of linoleohydroxamic acid to the oil was about 20%.

The same procedure was applied to linseed oil (saponification value 189.66, mean mol. wt. 886.50, iodine value, 178.3) for the isolation of pure linolenic acid.



S ....stearic acid

O. l. ....large amount of oleohydroxamic and small amount of linoleohydroxamic acid.

L. ln. o. ......large amount of linoleo- and small amount of linoleno- and oleohydroxamic acid.

Ln. l. ....large amount of linoleno- and small amount of linoleohydroxamic acid.

The schedule was tabulated as follows. 8.7 g of crystallized linolenohydroxamic acid (m.p. 37∼38°C) were obtained from 44 g of linseed oil.

The cost of this research has been defrayed from the Scientific Research Expenditure of the Department of Education to the authors' sincere gratitude.

On the Chemical Studies of the Baggasse Pulp. (6).

(pp. 776∼778)

By Tetutaro Tadokoro and Masao Nishida.

(Hokkaido Imperial University; Received July 29, 1941.)

Studies on the Components of the Bark of Rhamnus japonica (V).

The Position of the Free Hydroxyl-group of α-Sorinin.

(pp. 779∼783)

By Zirô Nikuni.

(Agr. Chem. Laboratory, Tokyo Imp. Univ.; Received August 26, 1941.)

As reported previously, α-sorinin is a primveroside of α-sorigenin(1). The latter is the lactone of x, x-dihydroxy-x-methoxy-3-hydroxymethyl-2-naphthoic acid(2). There is a wide difference between the characters of the two hydroxyl-groups of α-sorigenin. Namely, the one shows characteristic greenish colour with ferric chloride solution and is methylated very easily by diazomethane. But the other shows no colour reaction with ferric chloride solution and is methylated with difficulty.

To determine which hydroxyl-group may be present in free state when it is the glycoside, α-sorinin (the glycoside) was methylated with diazomethane and then hydrolysed with dilute sulphuric acid. The resulting aglycone shows no colour reaction with ferric chloride solution and is identical with the monomethyl-α-sorigenin(1) obtained from α-sorigenin by methylation with diazomethane. It melts at 196∼197°. So it is evident that the new methoxyl-group of monomethyl-α-sorigenin corresponds to the free hydroxyl-group of the glycoside.

On oxidation of α-sorigenin and its derivatives by potassium permanganate, the following results are obtained.

(1) From α-sorigenin scarcely any oxidation products were obtained. It means that the two hydroxyl-groups are divided to different rings of the naphthalene nucleus.

(2) From monomethyl-α-sorigenin faint yellowish prisms (m. p. 250∼251°) are obtained. From the analytical results, acidity and absorptionspectrum it is determined as monomethoxy-pyromellithic acid, which is a new compound.

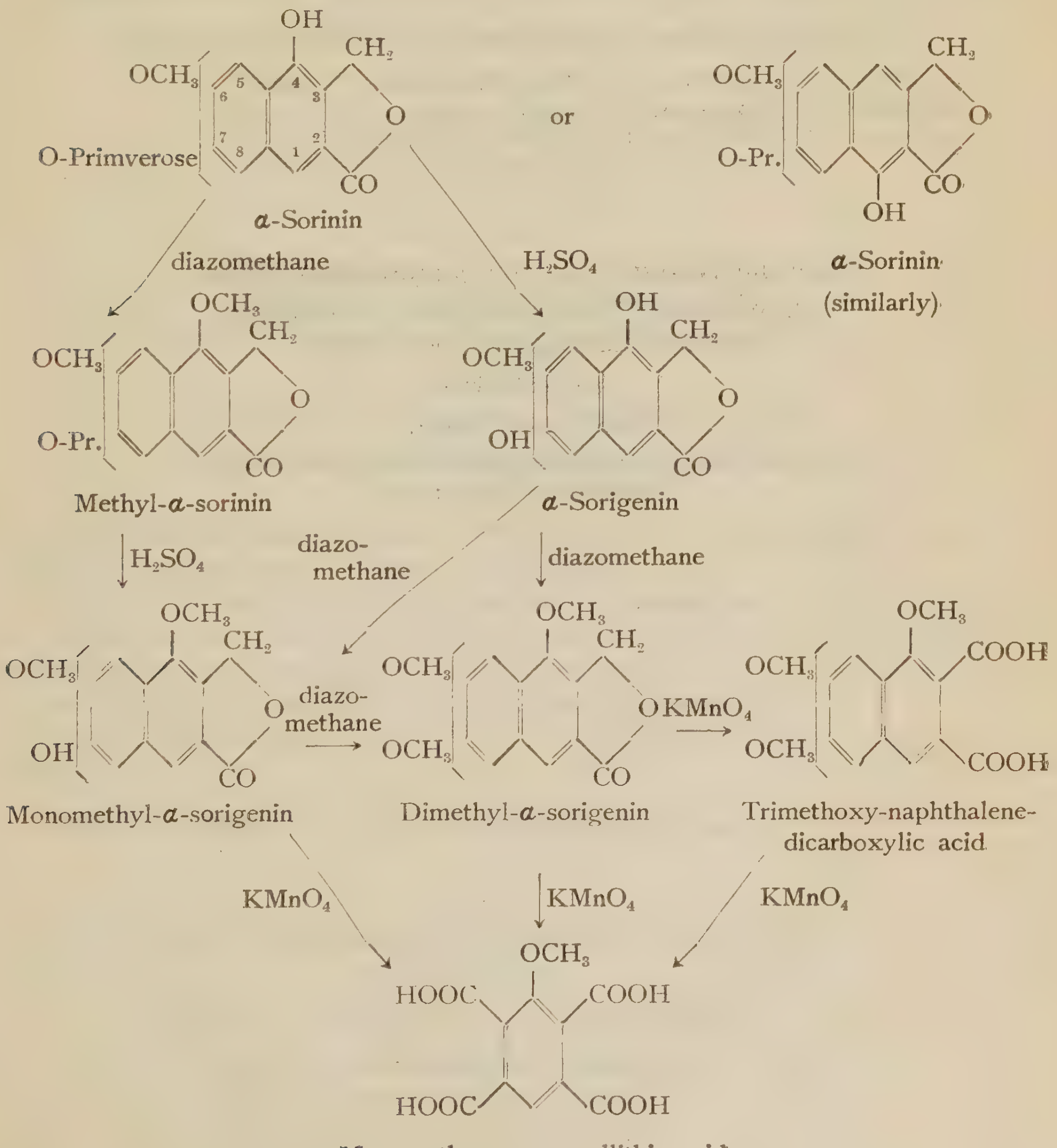
Analytical results:

	C%	H%	OCH_3%
Observed	46.90	3.50	12.43
Calculated as $C_{11}H_8O_9$	46.46	2.83	10.92

Acidity (titrated with 0.1 *N* HaOH solution by microburette)

	NaOH
Sample 3.992 mg	2.286 mg
Calculated as $CH_3O \cdot C_6H(COOH)_4$	2.249 mg

Thus it is clear that the new methoxyl-group of the monomethyl-α-sorigenin is present at the centre ring of the compound.



(3) From dimethyl-α-sorigenin and trimethoxy-naphthalene-dicarboxylic acid(3), monomethoxy-pyromellithic acid is also obtained, showing that the left side ring of these compounds is less stable than the centre ring.

α-Sorinin is therefore the lactone of *x*-primverosido-*x*-methoxyl-1 or 4-hydroxy-3-hydroxymethyl-2-naphthoic acid.

The results are indicated as the figures (page 93):

In conclusion the author desires to express his sincere thanks to Prof. Bunsuke Suzuki for his kind guidance throughout this work, and to the Imperial Academy for a grant, which has in part defrayed the cost of this investigation.

LITERATURE.

(1) Nikuni: Bull. Agr. Chem. Soc. of Japan, **14**, 25 (1938); C. **1938**, II, 77.
(2) Nikuni: ibid., **15**, 43 (1939); C. **1939**, II, 1292.
(3) Nikuni and Hayashi: ibid., **15**, 158 (1939); C. **1940**, I, 1996.

Über die Bestandteile der japanischen Mistel.

III. Mitteilung. Oleanolsäure, zwei Harzalkohole (β-Amyrin u. Lupeol) in den Blättern.

(SS. 784~786)

Von Yataro OBATA.

(Biochemiches Institut der Landwirtschaftlichen Fakultät, Universität Tokio:
Eingegangen am 22. 8. 1941.)

ABSTRACTS
from
TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noted.)

On the Forest Soil Type in North-Eastern Manchuria.

(pp. 787～793)

By R. KAWASHIMA, S. TANAKA, and G. TOYAMA.

(Agricultural Chemical Laboratory, Kyushu Imperial University;
Received September 2, 1941.)

Studies on Crystalline Catalase. (I).

On the Isolation of Crystalline Catalase from Beef Liver.

(pp. 794～796)

By Matsunosuke KITAGAWA and Masaharu SIRAKAWA.

(Agricultural Chemical Laboratory, Kyushu Imperial University;
Received September 8, 1941.)

The crystalline catalase was obtained from beef liver by our acetone method, which had been rejected by Sumner and Dounce(1).

The fresh extract of the ground beef liver is treated twice with 0.8 volume of acetone and then is precipitated with 0.4 saturated ammonium sulfate. Dissolving the precipitate in concentrated solution and allowing it to stand at about 5° for two days, the catalase is crystallized in the needle form.

The catalase activity, "Kat. f.", was determined, the value of which was 25,500.

(1) J. B. Sumner and A. L. Dounce: J. Biol. Chem., **121**, 417 (1937).

The Determination of Carbonic Acid. (II).

(pp. 797～800)

By Yosaburo IWASA and Kunitaro IWAMOTO.

(Dept. of Food Chemistry, Osaka Municipal Hyg. Lab.;
Received September 1, 1941)

Studies on Vitamins of Fish Livers. (Part III).

Relation Between Vitamin A Content and Characteristics of Liver Oil.

(pp. 801~813)

By Hideo HIGASHI.

(Imperial Fisheries Experimental Station, Tokyo, Japan;
Received August 30, 1941.)

(I) Relation between vitamin A content and refractive index (or iodine value) of liver oil.

The author's experimental results are as follows:—

TABLE I.

Species	Oil Content of Liver (%)	C. L. O. U.	Refractive Index
Squalus suckleyi	—	24.5	1.4699
	—	24.5	1.4695
	—	21.0	1.4697
	—	21.0	1.4696
	—	21.0	1.4694
	—	21.0	1.4691
	—	21.0	1.4687
	—	3.5	1.4690
	—	3.0	1.4680
	53.4	0.98	1.4675
	53.4	0.70	1.4679
Cynias manazo	41.2	2.6	1.4810
	29.4	2.6	1.4752
	30.9	0.5	1.4803
	13.2	0.3	1.4752
	30.0	0.15	1.4780
	47.1	0.1	1.4760
	43.2	0.1	1.4752
	50.8	0.1	1.4738
Prionace glausa	30.2	1.75	1.4722
	66.5	0.65	1.4699
Lamna cornubica	75.0	4.87	1.4732
	13.8	4.20	1.4741
	13.8	2.60	1.4758
	85.0	0.30	1.4760
	33.8	21.0	1.4729
	33.8	0.42	1.4750
Scoliodon walbeemi	46.6	0.44	1.4691
	42.4	0.06	1.4710
Sphyrna zygaena	—	126	1.4759
	—	90	1.4799
Pseudotriakis acreges	35.54	0.62	1.4656
	35.54	0.62	1.4660
Oncorhynchus masou	2.61	20.0	1.4802
Oncorhynchus keta	2.66	24.4	1.4774
Oncorhynchus kisutch	1.96	30.2	1.4824
Oncorhynchus tschawytscha	3.06	97.5	1.4771
Oncorhynchus nerka	2.12	100.0	1.4826
Zeus japonicus	9.20	12.6	1.4683
	25.6	2.6	1.4688
	45.7	0.44	1.4724
	17.9	3.72	1.4703
	23.8	0.7	1.4712
Scomber japonicus	4.69	90	1.4719
	4.52	30	1.4815
	3.36	24	1 4788
	1.04	22.5	1.4788
	12.2	15	1.4796
	20.7	15	1.4722
	16.0	13	1.4740
	6.26	12.6	1.4824

Thunnus orientalis	14.9	218.6	1.4826
	10.0	203.0	1.4776
	13.5	65.0	1.4728
	—	33.6	1.4793
	—	28.0	1.4757
	—	14 6	1.4752
	6.1	12.6	1.4835
Germo germo	2.16	92.5	1.4935
	12.9	24.4	1.4670
Neothunnus macropterus	3.36	420	1.4814
	3.50	220	1.4660
	36.7	105	1.4771
	2.32	840	1.5008
	3.05	700	1.5039
	2.38	420	1.4919
	2.18	245	1.4920
	3.37	240	1.4891
	2.63	210	1.4899
	1.92	175	1.4848
	2.04	147	1.4872
	3.02	126	1.4794
	3.24	105	1.4771
Katsuwonus vagans	3.43	28.4	1.4890
	3.53	24.4	1.4890
	2 55	15.6	1.4813
	5.16	12.1	1.4723
	1.03	97.5	1.4820
	5.9	97.5	1.4750
	3.20	48.7	1.4803
	4 29	49.0	1.4872
	1.50	35.0	1.4789
	3.25	30.0	1.4868
	4.57	24.5	1.4775
	4.19	10.5	1.4812
	5.76	3.0	1.4755
	15.43	2.6	1.4719
	15.42	2.6	1.4709
Pumpus argenteus	8.74	0.1	1.4692
	9.9	0.1	1.4652
Xiphias gladius	5.38	1000	1.4960
	1.37	490	1.4894
	9.9	450	1.4783
	5.88	450	1.4783
	3.1	91	1.4822

Xiphias gladius	28.5	30	1.4740
Corypaena hippurus	8.18	2.8	1.4662
	18.7	1.3	1.4563
Brama raii	2.55	310	1.4890
	4.00	210	1.4947
	3.71	210	1.4915
	4.76	210	1.4828
	4.06	150	1.4858
	4.37	126	1.4897
	4.21	120	1.4858
Sebastodes flammeus	25.0	20.3	1.4732
	30.8	72	1.4702
	35.3	48.7	1.4713
	53.9	21.8	1.4661
Sebastodes iracundus	15.3	2880	1.5154
	15.4	1700	1.4996
	11.3	1450	1.4914
	16.2	975	1.4872
	21.0	975	1.4870
	15.5	974	1.4910
	30.8	875	1.4822
	13.2	812	1.4841
	7.5	811	1.4825
	4.1	720	1.4890
	4.7	720	1.4837
	6.0	650	1.4868
	27.5	569	1.4759
	16.9	568	1.4794
	22.7	568	1.4800
	16.9	568	1.4785
	21.8	568	1.4780
	8.32	487	1.4835
	17.8	406	1.4793
	15.4	406	1.4735
	20.7	244	1.4745
	19.0	169	1.4741
	34.8	145	1.4690
	32.8	130	1.4698
	46.2	130	1.4670
	22.8	130	1.4667
	32.9	114	1.4710
	33.3	97.5	1.4700
	17.8	90	1.4708
	29.5	56.8	1.4700
	29.5	48.7	1.4700

Sebastodes iracundus	24.9	48.7	1.4688
	52.6	34.8	1.4665
	58.5	17.4	1.4659
Paralichthys olivaceus	15.7	62	1.4860
	27.7	42	1.4860
	4.4	24.5	1.4762
	12.5	12.6	1.4880
	4.37	9.8	1.4805
Kreius bicoloratus	15.0	7.0	1.4762
	30.2	1.3	1.4723
	25.7	0.6	1.4738
Gadus macrocephalus	—	14.8	1.4710
	—	14.3	1.4715
	—	13.9	1.4710
	—	3.0	1.4750
	—	2.6	1.4752
	—	3.0	1.4730
	—	13.5	—
Theragra chalcogramma	—	17.5	—
	34.86	12.6	1.4719
	34.9	12.6	1.4710
Brama rail	2.72	105	1.4828
	2.52	104	1.4844
Seriola quinqueradiata	2.95	490	1.4860
	1.92	336	1.4910
	2.68	240	1.4835
	6.50	210	1.4799
	2.46	120	1.4815
	5.35	60	1.4742
	13.3	42	1.4758
Niphon spinosus	26.8	117	1.4830
	18.8	14.7	1.4680
Epinephelus paecilonotus	7.26	105	1.4750
	5.88	42	1.4728
	3.8	11	1.4725
Stereolepsis ischinagi	24.8	1380	1.4946
	10.5	1050	1.4740
	14.7	840	1.4940
Stereolepsis ischinagi	16.3	284	1.4790
	19.2	203	1.4760
Etelis carbunculus	7.0	600	1.4915
	5.18	600	1.4912
	5.7	600	1.4815
Pristipomoides sieboldi	5.26	1260	1.5061
	20.1	175	1.4769
Nibea mitsukuri	7.9	62	1.4710
	9.14	44	1.4658
	22,3	146	1.4652
Sebastodes inermls	14.0	19.5	1.4660
	23.3	12.2	1.4698
	23.9	10.4	1.4683
Sebastodes baramenuke	16.31	36.0	1.4787
	14.45	194	1.4743
	21.48	174	1.4750
	21.9	174	1.4742
	18.48	114	1.4784
	23.14	72	1.4793
Sebastodes flammeus	8.3	2240	1.5092
	17.4	975	1.4856
	21.1	582	1.4835
	25.4	568	1.4841
	25.4	568	1.4830
	10.4	487	1.4847
	19.6	487	1.4792
	17.2	487	1.4817
	13.1	406	1.4850
	20.1	405	1.4791
	18.7	325	1.4770
	17.3	325	1.4757
	22.9	284	1.4720
	20.6	244	1.4751
	18.3	244	1.4749
	22.9	244	1.4740
	23.8	243	1.4733
	23.9	216	1.4713
	26.8	204	1.4724

As the refractive index of vitamin A is especially high, the oils extremely rich in vitamin A show high values of refractive index. (Table 1)

(II) Relation between vitamin A content and unsaponifiable matter of liver oil.

The author's experimental results are as follows:

TABLE II.

Species	No. of Sample	Oil Content of Liver (%)	C.L.O.U. of Liver Oil	Unsaponifiable Matter in Liver Oil (%)	Unsaponifiable Matter in Liver (%)	Stereol in Unsaponifiable Matter (%)	Stereol in Liver Oil (%)	Stereol in Liver (%)	R. I. of U. M.	I. V. of U. M.
Thunus orientalis	1	14.9	218.6	9.36	1.395					
	2	13.5	65.0	4.95	0.668					
	1	19.2	203	7.36	1.413					
	2	16.3	284	6.87	1.120					
Balaenoptera physalus	1	4.21	336	19.0	0.800					
	2	3.61	361	13.5	0.487					
	3	1.98	198	12.6	0.249					
Sebastodes iracundus	1	15.3	2880	34.1	5.22	8.03	2.738	0.419		
	2	21.0	975	19.2	4.04	21.7	4.166	0.875		
	3	15.5	975	19.7	3.05	16.0	3.152	0.489	1.5525	244.8
	4	30.8	875	12.6	3.88	20.5	2.583	9.796		
	5	8.32	487	12.3	1.09	20.5	2.522	0.210		
	6	25.4	406	6.64	1.689	23.4	1.554	0.395	1.5240	171.2
	7	17.8	406	9.1	1.62	26.7	2.430	0.433		
	8	32.8	130	5.01	1.643	34.4	1.754	0.575	1.5025	125.6
	9	21.2	130	4·08	0.865	40.8	1.665	0.353	1.5165	142.7
	10	22.8	114	5.34	1.218	53.0	2.830	0.644	1.4952	126.4
	11	24.9	48.7	4.55	1.133	52.8	2.402	0.599	1.4795	114.5
	12	58.5	17.4	4.06	2.375	45.7	1.855	1.085	1.4877	
Sebastodes flammeus	1	11.4	975	17.4	1.985	19.3	3.358	0.383	1.5634	238.8
	2	13.4	582	13.0	1.742	23.8	3.094	0.415		
	3	10.4	487	14.3	1.487	30.5	4.362	0.454		
	4	19.6	487	11.2	2.195	32.5	3.640	0.713	1.5255	198.9
	5	17.2	444	11.3	1.944	28.3	3.198	0.549		
	6	20.6	244	10.7	2.204	31.2	3.338	0.688		
	7	18.3	244	7.94	1.453	37.4	2.970	0.544	1.5080	172.8
	8	26.8	204	6.37	1.707	34.8	2.217	0.595		
	9	25.0	203	7.61	1.903	42.0	3.196	0 799		
	10	35.3	48.7	5.15	1.818	51.5	2.652	0.936		
	11	53.9	21.8	4.97	2.679	53.5	2.659	1.433		

As shown in table 2, the content of unsaponifiable matter in liver oil decreases when the vitamin A content of liver oil decreases. And the proportion of sterols in the unsaponifiable matter shows an inverse relationship with the amount of unsaponifiable matter in the oil.

In the cases of *S. iracundus* and *S. flammeus* the vitamin A content of unsaponifiable matter increases when the vitamin A content of the liver oil increases.

On the Fixation of Sericin of Raw Silk. (Part VII).

Dechroming Action of Some Chemicals and Chemical Combinations between Sericin and Basic Chromium Complex Salt of Chrome-fixed Cocoon Silk Fibres.

(pp. 814~822)

By Masami Oku and Sigetosi Saito.

(From the Chemical Fibre Laboratory, Ueda Imperial College of Sericulture and Silk Industry; Received August 30, 1941.)

We have investigated the dechroming action of some chemicals and discussed the mode of chemical combination between sericin and basic chromium complex salt of the chrome-fixed cocoon silk fibres. Dechroming chemicals used in this experiment were Rochelle salt, oxalic acid, sulphuric acid and hydrochloric acid. Results obtained are summarised as follows:

(1) The following conditions were found to be most adequate for the dechroming action under boiling state:

(i) Rochelle salt: 10% solution, 1 hour boiling.

(ii) Oxalic, sulphuric and hydrochloric acid: each 1.0% solution, 10 minutes boiling.

But the complete dechroming could not be obtained without having bad influences upon the firmness of the fixation degrees.

(2) The following conditions were found to be adequate for the dechroming action without having bad influences upon the fixation degrees under boiling state:

(i) 10% Rochelle salt solution containing 8% formaldehyde, boiling for an hour.

(ii) 1.0% sulphuric acid containing 8% formaldehyde, boiling for 10 minutes.

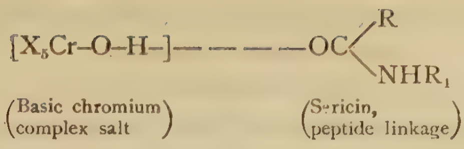
(3) When dechromed under room temperature, oxalic acid was found to be most effective, followed next by sulphuric acid and hydrochloric acid. Rochelle salt was found to be most ineffective, but this chemical was found to be most effective in inviting the reversibility of the soluble property of chrome-fixed sericin.

(4) The following solutions were found to be adequate for the dechroming action without losing the firmness of fixation degrees by room temperature.

(i) 5.0% oxalic acid, sulphuric or hydrochloric acid containing 4% formaldehyde, soaking for 10 days longer under room temperature.

(ii) Rochelle salt, in spite of the co-reaction with formaldehyde, showed inferior properties in dechroming, having bad influences upon the firmness of the fixation degrees.

(5) Mode of chemical combination between sericin and basic chromium complex salt by the sample which was tanned under room temperature was discussed from the viewpoint of dechroming results and the following figure was deemed as most probable.



$$[X_5Cr{-}O{-}H{-}]\text{------}OC\begin{matrix}R\\NHR_1\end{matrix}$$

Synthese des Oxyäthlphthalimid.

(SS. 823～824)

Von Y. OBATA.

(Biochemiches Institut der Landwirtschaftlichen Fakultät, Universität Tokio; Eingegangen am 20. 8. 1941.)

Untersuchungen über das sogenannte „Gluconobacter“. II. Mitteilung.

(SS. 825～832)

Von Teijirô UYEMURA und Keiji KONDÔ.

(Wissenschaftl. Laboratorium von Ch. Takeda & Co. Ltd., Osaka; Eingegangen am 28. 4. 1941.)

Functional Studies on Soil. (XXXVIII～XXXX).

(pp. 833～838)

By Hideo MISU.

(Agricultural Experiment Station, Government General of Tyusen; Received May 5, 1941.)

Studies on "Tosetu," a Soy-bean Preparation. II.

On the Vitamin B Content of Tosetu.

(pp. 839～847)

By B. KITAHARA, K. KATAI, and M. HANADA.

(Department of Agriculture, Kyūshū Imp. University and Nippon Yusi Kabusiki Kaisya; Received August 11, 1941.)

Studies on the Nutritive Value of Weeds. (3).

(pp. 848～852)

By G. FUKAI and M. SATAKE.

(Military Veterinary College; Received August 12, 1941.)

On the Biochemical Properties of Tomato and Potato Viruses.

(pp. 858～855)

By Tetutaro TADOKORO, Tuneyuki SAITO, and Naomoto TAKASUGI.
(Hokkaido Imperial University; Received August 11, 1941.)

On the Absorption Spectrum of Fatty Oils in Ultraviolet Region.

(pp. 856～862)

By Kozo KAWAKAMI and Hideo MIYAYOSHI.
(The Institute of Scientific Reseach, Manchoukuo; Received July 31, 1941.)

The absorption spectrums of 18 kinds of vegetable oils were observed and it was found that all of them showed the same spectrum in ultraviolet region. By more minute observations, a slight variation of the maximum absorption points were seldom recognized, and the variation was so slight that it was often overlooked. These absorption-maximums were as follows: 3130, 3000, 2820, 2700, 2600, and 2510 Å. The observation of the absorption at 2300 Å which is found in literature, was not undertaken in this experiment. Those points of absorption-maximums were all coincident with those of eleostearic acid and a new fatty acid prepared by Moore from linseed oil by the alkali treatment.

Edisbly and Bradley have supposed that the origin of the absorptions at 3000 and 3130 Å differs from those of the others. The present authors also maintain the same supposition, because the ratio of the extinction coefficient of 3130 Å to that of 3000 Å was almost constant, and the same fact was also observed among the other four absorptions. However, no definite ratio but enormous variations were found between the extinction coefficients of the two absorption groups.

In order to investigate the origin of the absorptions, linseed oil was treated with maleic acid anhydride and a oil free from conjugated double bonds was obtained. A distinct absorption spectrum, special for fatty oils, was observed with the original linseed oil, but it was very weak with the treated oil. It was also proved that no hydroxy compounds took part in the absorptions. For these reasons it is emphasised that the absorptions are due to the conjugated double bonds which may be found in fatty acids.

As to the cause of the absorptions from 2800 to 2500 Å, Bradley has supposed that it may be due to a conjugated trien. However, it was found that the dehydrated product of richinoleic acid which may have no conjugated trien but perhaps a conjugated dien, shows distinct absorption at the definite points. Consequently further investigation must be carried out in this respect.

A co-relation between the extinction coefficients of those absorption-maximums and the drying character of fatty oils was recognized, but there were some exceptions. Therefore the extinction coefficient may not indicate perfectly the degree of the drying character of fatty oils, but that may be an important indicator.

Chemical Researches on the Dyeing of "Oshima-Tsumugi." Part I.

On the Dyeing Tannins from *Rhaphiolepsis umbellata.*

(pp. 863~869)

By Kotaro NISHIDA.

(Laboratory of Agricultural Chemistry, Kagoshima Agricultural College;
Received September 3, 1941.)

Chemical Studies on Shark-Meat. (I).

On the Chemical Composition of Shark-Meat.

(pp. 870~874)

By Kinsuke KONDO, Sakae SHINANO, and Kenkichi YAMAMOTO.

(Nutritional Chemical Laboratory, Department of Agriculture, Kyoto Imperial University;
Received August 28, 1941.)

On the Denaturation of Proteins in Benzine-Extracted Soy-bean During Storage. (I).

(pp. 875~882)

By Shigeki MORI.

(Kondo Laboratory, Institute for Chemistry, Kyoto Imperial University;
Received September 11, 1941.)

Enzymatic Studies on Cereals. (Part XIV).

On the Mechanism of the Decomposition of Starch
by the Action of the Amylase of Rice.

(pp. 883~893)

By Gohei YAMAGISI.

(Morioka Imperial College of Agriculture and Forestry;
Received August 11, 1941.)

Up to this time a number of experiments have been performed about the mechanism of the starch-decomposition by the amylase action. And yet no uniformity of opinions was reached in this respect.

The author has investigated this problem using the rice amylase.

The findings may be summarized as follows:

1) The velocities of saccharification of starch by the action of the dextrinifying and the saccharifying amylases were very great at the first two or three hours and then decreased gradually. But even after the lapse of 10 days the saccharifying velocities did not reach zero. After 10 days the degree of saccharification by the dextrinifying and the saccharifying amylases were about 55 per cent and 80 per cent of the theoretical value respectively.

2) In the case of the saccharifying amylase it took two days to make the blue colour disappear with iodine while in the case of the dextrinifying enzyme it disappeared within one hour.

3) In the saccharifying enzyme the disappearance of the colour of starch by iodine occurred just when the degree of decomposition of starch reached 48 per cent, while in the dextrinifying one, it was perfectly colourless when only 17 per cent of starch was saccharified.

4) The liquefying amylase liquefied starch very rapidly at the outset, and then slowly as the time elapsed. After the lapse of one or two days the decomposition reached a limiting value and it was almost completely liquefied using a considerable amount of the enzyme. In spite of the liquefaction of starch being almost entirely finished, the degree of saccharification at that time did not attain 9 per cent and no change of the characteristic blue colour of the digestion mixture with iodine was observed.

5) The decomposition of starch by the saccharifying amylase followed the course of a monomolecular reaction up to about 50 per cent of the saccharification. But in the case of the dextrinifying amylase, a constant value was not obtained for the first order equation.

6) When starch was hydrolysed by the action of the dextrinifying amylase, maltose was formed besides dextrin in the initial stage of the reaction, but using the saccharifying amylase, in addition the existence of glucose was observed.

7) It could be confirmed that in the decomposition products of starch by the action of the dextrinifying amylase a reducing substance which had a higher molecular weight than maltose existed.

8) In both saccharifying and dextrinifying amylases in the course of the decomposition of starch there was a period when the maltose contents were maximum. But the final product was likely to be glucose, though it has been left for further investigation to decide whether or not that was caused by means of the maltase which might occur as an impurity.

9) From the experimental results above stated it could be clearly seen that the three starch-splitting enzymes, the liquefying, the dextrinifying and the saccharifying amylases, decomposed starch with their respective mode. This lends support to this author's opinion, namely, the theory of three enzymes of rice amylase.

Biochemical Studies of "Bakanae" Fungus.

Part 11. The Chemical Constitution of Gibberellin. II.

(pp. 894~900)

By T. Yabuta, Y. Sumiki, K. Aso, T. Tamura,
H. Igarasi, and K. Tamari.

(Tokyo Imperial University; Received August 4, 1941.)

ABSTRACTS
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(Pages refer to the Japanese originals of this volume unless otherwise noted.)

Chemical Studies on Shark-Meat. (II).

On the Solubilities of Shark-Meat-Protein.

(pp. 901～904)

By Kinsuke KONDO and Yoshio YAMAMOTO.

(Nutritional Chemical Laboratory, Department of Agriculture, Kyoto Imperial University; Received August 28, 1941.)

Studies on Insulin from Fishes.

(pp. 905～912)

By Yuzo TOHYAMA, Sogo TETSUMOTO, Saburo FUKUYA, and Shuzo YAMADA.

(Department of Food Control, The Government Institute for Infectious Diseases, Tokyo Imperial University; Received August 28, 1941.)

Insulin, the internal secretion of the pancreas, is formed in the islet tissue of that organ and passes from there into the general circulation. Brunner,(1) 1682, suggested that the pancreas was in some way connected with the metabolism of fat and carbohydrates. Little progress was made, however, until the classic researches of von Mehring and Minkowski(2) who discovered that the complete removal of the pancreas from dogs is followed by symptoms which closely resemble those observed in human diabetes mellitus. In 1846 Stannius(3) described the structures in the abdominal cavity of certain of the Teleostei. These were afterwards shown by Diamare(4) (1899) to be homologues with the islets of Langerhans of the higher vertebrates. Rennie(5) (1903) examined the islets in 25 species of Teleostei, and usually found at least one encapsulated islet, which he called the "Principal Islet," of relatively large size in each species of fishes. Some 90 species of fish were subsequently examined by McCormick(6) (1924) and also Japanese fishes investigated by Ohsawa(7) (1915), Ukai(8) (1926), Suehiro(9) (1941) and others. From these researches, we know that considerable variation was shown to exist among different species with regard to the position, size, and number of the islets.

Banting and Best(10) succeeded in 1922 preparing physiologically active extract of the pancreas and clearly demonstrated the ability of these extracts to inhibit glycosuria and hyperglycemia in depancreatized animals and to alleviate the symptoms of diabetes mellitus in human beings. The insulin content of the islet tissue of the cod, the halibut and other common fish has been investigated by various workers such as Macleod,(11) McCormick,(12) Vincent, Dodds and Dickens(13) and others. We also gathered the principal islets of tunny, bonito, cod, yellowfish, mackerel and other fishes and extracted with picric acid and the insulin picrate was then extracted from the mass by moist acetone and converted to hydrochloride, mainly following Dudley's method(14) (1924) which applied to the extraction of insulin from the islets of the cod, and also another method we used was the extraction of the fish islets with acid alcohol, namely, the minced fish islets is extracted with 75% ethyl alcohol containing 1.5% of concentrated hydrochloric acid at 35°C and after adjusting pH, precipitated by acetone, washing with acetone and ether, obtained white powder after drying in vacuo.

On standardization of insulin, the physiological method which proved more applicable for the determination of the activity of insulin than chemical method, we applied in our case the cross-over method of Marks :(15) taking six rabbits of approximately 2 kilograms, starved for 24 hours previous to the experiment, and divided into 2 groups and injected subcutaneously with a suitable dose of the standard preparation of insulin into one half of a series of rabbits, and the other half receiving simultaneously a dose of the sample of unknown unitage. 4 to 7 days later the groups are crossed over and are used for the injection of the same preparations. Blood samples are usually taken at one and one-half, at three, and at five hour intervals after the injection or at every hour within the course of five hours. We employed Hagedorn and Jensen's(16) method for the determination of blood sugar. Thus we continued the experiment of the cross over method till the ratio of the blood sugar lowered between two series within 5%, and calculated the potency of our preparation. If we bring together the above experiments, they would be as shown in the following table :—

Name of Fish	Number of fish used	Yield of Langerhans islet (g)	Yield of Insulin. (g)	Percentage of yield (%)	International unit (IE)	International unit per g of L. islet (IE)	International unit per fish (IE)
Germo-germo (1)	809	80.00	0.5600	0.700	10.00	70.00	6.9
Germo-germo (2)	173	17.00	0.3400	2.000	ca. 8.00	160.00	15.7
Germo-germo (3) (Frozen)	610	60.00	0.6246	1.041	17.0	193.60	19.0
Neothunnus macropterus	97	13.00	0 2462	1.893	ca. 9 10	172.34	22.9
Parathunnus sibi	114	15.0	0.2040	1.361	ca. 10.00	136.10	17.9
Katsuwonus vagans (1)	665	60.00	0.3881	0.646	20.00	129.36	11.6
Katsuwonus vagans (2)	115	10.00	0.0545	0.545	ca. 20.00	109.00	9.4
Gadus macrocephalus	310	25.00	0.2889	1.155	13.30	153.69	12.3
Sebastodes flammens	1070	72.00	0.9328	1.294	15.00	194.33	13.0
Seriola quinqueradiata	106	13.70	0.2172	1.585	ca. 8.0	126.80	16.4
Scomber japonicus	1370	20 60	0.1543	0.749	ca. 13 00	97.30	1.5

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On the Steppe Soil Type in North-Eastern Region of Manchuria.

(pp. 913~918)

By R. KAWASHIMA.

(Agr. Chem. Laboratory, Kyushu Imp. University; Received September 30, 1941.)

Untersuchungen über das sogenannte „Gluconobacter.“ III. Mitteilung.

(SS. 919~927)

Von Teijirô UYEMURA und Keiji KONDO.

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The Chemical Components of Cotton-hulls Produced in Manchuria and North-China.

(pp. 928~930)

By Rishichi TANAKA.

(The Central Laboratory, South Manchuria Railway Co., Dairen, Japan;
Received September 24, 1941.)

Studies on the Relationship between Horsehair's Lustre and Nutrition. (I).

(pp. 931～936)

By S. MIYAMOTO, N. ONUMA, K. ARAI, and G. FUKAI.

(Military Veterinary College; Received August 12, 1941.)

Über die Awamori-Bereitung nach dem modifizierten Amyloverfahren.

(SS. 937～943)

Von S. SIMO und N. KANAYAMA.

(The Institute of Research on Chemical Industry, Government-General of Taiwan, Japan; Received September 22, 1941.)

On the Denaturation of Proteins in Benzine-Extracted Soy-bean During Storage. (II).

(pp. 944～946)

By Shigeki MORI.

(Kondo Laboratory, Institute for Chemistry, Kyoto Imperial University; Received September 11, 1941.)

Functional Studies on Soil. (XXXXI～XXXXIII).

(pp. 947～958)

By Hideo MISU.

(Agricultural Experiment Station, Government General of Tyosen; Received May 4, 1941.)

Studies on the Production of Acetone and Buthanol by Fermentation. Part II.

On the Production of Acetone and Buthanol from Jerusaleum Artichoke.

(pp. 959～974)

By Toshinobu ASAI, Riukichi KOJIMA, and Isamu WATANABE.

(Agricultural Chemical Laboratory, Tokyo Imp. Univ; Received September 16, 1941.)

Inulin and fructan contained in Jerusalem artichoke can not be utilized for acetone-buthanol fermentation because of the incomplete decomposition to fructose molecule. Only the mash prepared from the completely saccharified tubers shows the normal fermentation.

It was found that the following conditions were suitable for fermentation.

Saccharifying conditions:—The weight of adding water to the fresh tuber was about twice the volume of it. HCl was added to 0.15% concentration to the cooking mass, the cooking pressure was about 30 lbs and the cooking duration was between 50~60 minutes. Saccharifying ratio reached to over 90% calculated as fructose.

Fermentation conditions:—Optimum H-ion concentration for the fermentation was between pH 4.8~5.2, and optimum concentration of the mash existed between 6~7% of the fructose concentration from the standpoint of industrial purpose. Addition of the nutrients were not necessary.

Under the above conditions, ca. 9.00% of acetone and ca 17.00% of buthanol, calculated each to the original inulin value of the tubers, were produced after 43 hrs. fermentation. The temperature of incubation was 35°C. The acetone-buthanol bacillus used was Clostridium Nr. 314 isolated and cultivated in this laboratory, which showed the most excellent yield of the two solvents from Jerusalem artichoke.

The semi-plant scale fermentation was also conducted.

Biochemical Studies of "Bakanae" Fungus. Part XII.

The Chemical Constitution of Gibberellin. III.

(pp. 975~984)

By T. Yabuta, Y. Sumiki, K. Aso, T. Tamura, H. Igarasi, and K. Tamari.

(Tokyo Imperial University; Received August 4, 1941.)

Study of the Insecticidal Principle in the Smoke Produced by Combusting Insect Powder. (Part V).

(pp. 985~991)

By Makoto Nagase.

(Agricultural Chemical Department, Taihoku Imperial University, Taiwan;
Received September 21, 1941.)

Über die Bildung der Oxalsäure aus Methanol oder Ameisensäure durch Asp. niger. var Nr. 2. (Citronensäurebildner).

(SS. 992~994)

Von S. Baba.

(Aus dem Agrikulturchem. Laboratorium der Kaiserl, Tokio Universität;
Eingegangen am 29. Sept. 1941.)

Durch die Sporenkultur der Asp. niger. var. Nr. 2. (citronensäurebildner) konnte der Verfasser die Bildung der Oxalsuäre aus Methanol, welches die einzige Kohlenquelle ist, erst bestätigen.

Die Ausbeute der Oxalsäure beträgt 10% des Verbrauchsmethanols.

In Substituierung der Ameisensäure (als Amm-salz) für das Methanol konnte der Verfasser ebenso wie K. Bernhauer u. F. Slanina die Bildung der Oxalsäure, deren Ausbeute 35% der Verbrauchs ameisensäure ausmacht, bestätigen.

Die Zusammensetzung des Nährbodens ist wie folgt:

Methanol oder Ameisensäure	1%	K_2HPO_4	0.05%
$(NH_4)_2HPO_4$	0.55%	$MgSO_4 \cdot 7H_2O$	0.05%
KH_2PO_4	0.05%	PH	schwach sauer.

Die Kulturdauer ist 20 Tage.

Für die freundliche Hilfe bei dieser Untersuchung spricht der Verf seinen verbindlichsten Dank Prof. Dr. K. Sakaguchi, a. o. Prof. Dr. T. Asai und den Herren des Seminars aus.

Biochemical Studies on the Tissues and Organs of the Silk Worm, *Bombyx mori* L.

Part I. On the Catalase Actions of the Fatty Bodies.

(pp. 995~1000)

By Takeo NAKASONE.

(Mie Prefectural Sericultural Experiment Station; Received September 22, 1941.)

The author investigated some properties of the catalase in the fatty bodies of Bombyx mori and also the changes in the activities of the catalase according to the growth of the silk worm after the 4th instar.

The results may be summarized as follows:

1. The fatty bodies of the full grown larva of Bombyx mori show the reaction of about pH 6.70 but it differs more or less according to the stages of the development of the fatty bodies.

2. The optimum conditions for the activity of the catalase of the fatty bodies are about pH 6.8 in reaction and about 24~25°C in temperature.

3. There are racial and sexual differences in the activities of the catalase both in fatty bodies and body fluid; the activity is higher in No. 111 Japanese race than in No. 19 European and in the males than in the females.

4. Activities of the catalase in the fatty bodies according to the growth of the silk worm seems not to be influenced by the activities of the catalase in the body fluid.

5. The catalase action of fatty bodies and body fluid of the unhealthy silk worm is weaker than that of the healthy one.

6. The activities of the catalase of the fatty bodies of the silk worm are stronger at the stages of ecdysis or of metamorphosis than at other stages of growth.